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ABSTRACT

The development of a cost allocation model at Ohio State University is discussed. The model was designed to measure the direct, indirect, and total operating costs of university operations and to recover general fund overhead costs associated with unrestricted general fund support of auxiliary enterprises and revenue-generating activities. The cost data were also designed to determine full and direct costs per student credit hour and per major by student level for incorporation in policy analyses. The Costing and Data Management System (CADMS) of the National Center for Higher Education Management Systems (NCHEMS) was used as the computational device to support the project. The step-down method of cost allocation was used, and 26 steps were employed to allocate unrestricted costs to auxiliary enterprises and earnings operations. These sequential steps were arranged in a descending hierarchy according to the distribution of service benefits. Thirty-five parameters were used with the NCHEMS software to calculate percentages of overhead costs to be allocated to various recipients of overhead services. It was decided that some scaling of recovery rates was desirable, and it was concluded that full overhead costs should be allocated to operations doing business primarily with the general public or with other university operations, and that lower recovery rates should be assigned to units providing services to academic departments or students. Attention is directed to (1) changes that were implemented in the approach as economic times grew more difficult and (2) future development of the cost allocation model. Information about the CADMS software and a bibliography are appended. (SW)

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COST ANALYSIS AND OVERHEAD CHARGES AT A MAJOR RESEARCH UNIVERSITY

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THE ASSOCIATION FOR INSTITUTIONAL RESEARCH

This paper was presented at the Twenty-Second Annual Forum of the Association for Institutional Research held at the Denver Hilton Hotel in Denver, Colorado, May 16-19, 1982. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum papers.

D. R. Coleman, Chairman
Forum Publication
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ABSTRACT

Methods of cost analysis similar to those employed in this project at The Ohio State University have been in use at numerous institutions of higher education for many years. The OSU Cost Allocation Model is unique in its flexible design; utilization of multiple special purpose parameters; incorporation of scaling factors designed to reflect client, centrality of mission, and revenue generation capacity factors; adjustments for interest income; and its implementation process which allows for negotiation of services provided to the University. Implementation strategies and pitfalls are discussed. Avenues of further development are identified.

BACKGROUND

In April of 1977, the Office of Finance and Planning launched a project, called the OSU Cost Allocation Model, designed to measure the direct, indirect, and total operating costs of University operations and to recover general fund overhead costs associated with unrestricted general fund support of auxiliary enterprises and revenue generating activities. A clear premise of the project was that auxiliary enterprises and revenue generating activities, rather than being self-sufficient operations as normally assumed, were being subsidized by the University to the detriment of academic programs and the general financial condition of the University. The allocation of costs through the model was, therefore, intended to foster equity in resource allocation by providing a basis for earnings units to pay their fair share of administrative and physical plant costs.

A secondary use of the cost data was to determine full and direct costs per student credit hour and per major by student level for incorporation in various policy analyses. This paper describes some of the issues involved in the continuing development of the project.

PRIMARY CONSIDERATIONS

Methods of cost analysis, similar to those employed in this project, have been in use at numerous institutions of higher education for many years. Although many institutions have developed cost analysis methodologies, the successful utilization of results along the lines suggested

in this paper appears limited. Following, is a brief summary of some of the perspectives included in the development of the OSU Cost Allocation Model which are intended to address a number of implementation difficulties.

The OSU Cost Allocation Model was designed to provide flexibility in assessing the impact of various allocation scenarios in the sense that we wanted to avoid the pitfalls of assigning "one best way" status to the project. We knew that the ultimate success of the project would depend, in part, on our willingness and ability to make adjustments during various stages of overhead assessment negotiation. To this end, the NCHEMS Costing and Data Management System (CADMS) was employed as the computational device to support the project. This package has been distributed widely, is well documented, and has been debugged completely. Software implementation time is at most a two day effort (see note, page 12). The CADMS software package has been extremely useful in the further development of the project because numerous allocation scenarios can be tested quickly to assess their impact on indirect cost allocation. Indeed, we have reviewed hundreds of allocation schemes to find approaches that produce results which appear procedurally and logically sound in measuring resource consumption and benefits derived.

In selecting an appropriate cost allocation technique, we wanted to strike a balance between accuracy and feasibility. The step-down method of cost allocation was selected since it provides reasonable accuracy, avoids many of the "mystical" and computational difficulties associated with recursive

techniques, and is more intellectually appealing and defensible than a simplistic direct allocation approach.

The model uses 26 steps to allocate unrestricted costs to auxiliary enterprises and earnings operations. These sequential steps are arranged in a rough descending hierarchy according to the distribution of service benefits.

At one point, the incorporation of depreciation into the model was considered in order to recover total operating and capital costs. Given the complexity of determining who paid for which buildings and recognizing the already difficult implementation process ahead, the decision was made to limit the model to operating costs only.

Most commonly, institutions rely on only a few parameters (e.g. direct cost, FTE employees, student credit hours, square feet of space) for cost allocation purposes because of a lack of available data or fear of the drudgery associated with hand calculations. Our hypothesis was that the use of a relatively large number of special purpose parameters would produce more accurate and realistic results than those capable of being produced through more simplistic techniques.

Thirty-five parameters were input to the NCHEMS software for use in calculating percentages of overhead costs to be allocated to various recipients of overhead services. These data reflected 1976-77 fiscal year values and included financial information by sub-code from the University's financial

accounting system; personnel information from the University's faculty activity analysis and personnel data base; operation and maintenance of physical plant data from an internal physical plant operations cost analysis system; research appointments, research expenditures and research administration costs from The Ohio State University Research Foundation; headcount students and credit hours of instruction data from the Office of Registration, Records and Scheduling; and library cost data from a special study concerning the distribution of costs for technical services, public services, books and periodicals, and administration.

As an aside, collection of these thirty-five parameters for each fiscal unit is of more than sufficient value to justify the exercise even if no cost allocations had ever been performed. For the first time, the University had a cross file data base that described resource consumption and production patterns for every fiscal unit. As values for succeeding years were added to the cost model parameter data base, a series of profiles were developed which are now the principle data source supporting the annual budget negotiation process.

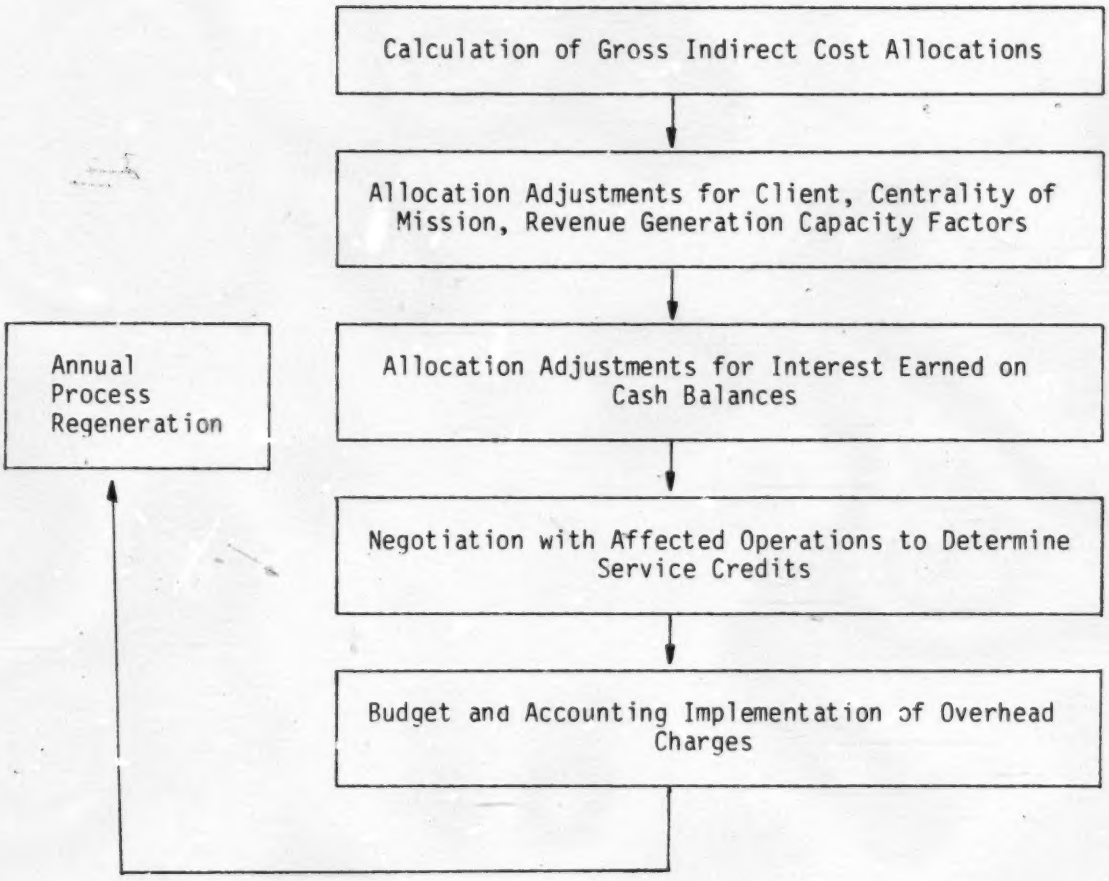
The use of raw financial data for cost analysis purposes is appealing from a strategic perspective in the sense that people tend to trust (all too often it is blind trust) hard, offical, machine-generated numbers that have not been manipulated with any particular intent. However, we were concerned that data which may be appropriate for accounting purposes may not be appropriate from an analytical perspective. As we reviewed tentative allocation results and sought to explain anomalies, it became clear that some

data manipulation was necessary. In particular, adjustments were made to reverse inter-departmental billings and to delete costs of goods sold from direct costs.

The treatment of auxiliary enterprises and earnings operations as financially self-sufficient units involves not only the allocation of gross indirect costs but also a recognition that such operations, as businesses, should receive full credit for services provided, but unbilled, to the University and for appropriate shares of interest income. To accomplish this, we envisioned a negotiation process in which overhead cost allocations would be adjusted for expenditures that would otherwise be borne by the University's unrestricted general fund and for interest income on cash balances.

The set of auxiliary enterprises and earnings operations at a major research university is incredibly diverse in terms of clients served and operational scope. In order to maximize the utility of the model and to allow for the exercise of some judgment concerning the ultimate burden of costs, we decided that some scaling of recovery rates was desirable. Generally, we concluded that full overhead costs should be allocated to operations doing business primarily with the general public or with other University operations and that lower recovery rates should be assigned to units providing services to academic departments or students. In addition, we saw a need to develop differential cost recovery rates based on the revenue generation capabilities of certain operations. The following figure shows the planned sequence of steps leading to full implementation.

IMPLEMENTATION SEQUENCE


Calculation of Gross Indirect Cost Allocations
Allocation Adjustments for Client, Centrality of Mission, Revenue Generation Capacity Factors
Allocation Adjustments for Interest Earned on Cash Balances
Negotiation with Affected Operations to Determine Service Credits
Budget and Accounting Implementation of Overhead Charges
Annual Process Regeneration

IMPLEMENTATION

By the end of 1977, we had a functional model and had processed numerous allocation scenarios. Since difficult economic times has not yet hit and there was absolutely no precedent at The Ohio State University for assessing overhead charges to auxiliary enterprises, we proceeded at a leisurely pace with discussions centering around the hierarchy of various fiscal

units in the step-down allocation process. (It should be noted that the adoption of any allocation logic is a matter of fact and value judgment unique to a particular setting. Different structures and actors require different scenarios.) As economic times grew more difficult, however, and the University suffered one budget cutback after another, we adopted a plan in Spring of 1981 that an overhead chargeback system be implemented using the 1976-77 model and that these overhead charges be assessed on a twenty-five cents on the dollar basis. The phased-in approach was agreed upon in order to allow auxiliary enterprises sufficient time to incorporate overhead charges in their planning and budgeting cycles and also in recognition of the antiquity of the data (1976-77). Finally, the phased-in approach, it was hoped, would reduce haggling over small issues.

In August, 1981 the University's new President, Dr. Edward H. Jennings, endorsed the project which was scheduled to recover approximately $2,000,000 after credits. By January of 1982, severe budget cuts were imposed by the State of Ohio due to revenue short-falls and unanticipated expenditure increases for entitlement programs. Shortly thereafter, President Jennings promugated a financial plan which, in part, called for immediately assessing full overhead charges to auxiliary enterprises and earnings operations ($8,000,000 after credits). The effect of this announcement was that the phased-in approach could no longer be used. i.e., costs would be assessed fully as calculated. Furthermore, credits for services provided to the University's general fund operations could no longer be considered. Credits or debits for positive or negative cash flow were still to be included in

the model, however. The new $8,000,000 overhead cost recovery plan is net of $3,000,000 in cash flow credits.

Shortly after the announcement of the $8,000,000 overhead cost recovery program, each office with earnings revenue was provided with a university indirect cost estimate which was the calculated overhead rate from the internal cost allocation model times the annual income budget. Income budget was selected because it is a more stable value than expenditure budgets and is less subject to manipulation. Adjustments will be made at year end to bring overhead charges in line with expenditures rather than income. In addition to the calculated University indirect costs, each revenue generating cost center was provided with physical plant operations cost data and total charges which is the sum of University indirect costs and physical plant costs. Estimated temporary investment income credits and/or debits were also provided and were defined as interest earned on investments from available cash balances maintained and/or provided by revenue generating fiscal units. The net impact on each of the earnings fiscal units was calculated as total charges minus estimated temporary investment income.

Actual overhead rates were calculated for each of the 29 revenue generating cost centers with earnings in excess of $500,000. There are 27 cost centers with earnings between $100,000 and $500,000 for which a single overhead rate was calculated. Likewise, all conference accounts were charged a single rate. Finally, a separate rate was calculated for all other earnings operations.

Each of the 29 fiscal units with earnings over $500,000 were provided the opportunity to review the supporting data behind the overhead cost allocations. After such review, they were invited to make claims for reductions or increases of their overhead charges. Having heard no claims for increases in overhead charges, we moved immediately to discussions of possible reductions. Analysis of the details behind the overhead charges ranges from very detailed to excruciatingly detailed. Claims for credits for at little as $74 were received. Negotiations related to issues of data accuracy, adjustments to the allocation base, and potential credit for authorized services provided to general fund operations and interest earned on investments of available cash balances. While there were never any questions regarding the accuracy of the calculations, several errors in the input data used to construct the allocation parameters were noted and all of these were corrected and appropriate adjustments to overhead charges were made. As noted earlier, no credits were allowed for services provided to the general fund by earnings operations.

The environment within which these overhead charges was assessed is an interesting one. The extreme financial difficulties from which the University is attempting to recover have resulted in a "circle the wagons" syndrome creating hitherto unheard of levels of cooperation. In retrospect, therefore, implementation of this project during these difficult times was most opportune. As of March 31, 1982, all overhead charges have been agreed upon and invoices have been mailed to each of the auxiliary units. With the beginning of the calendar year 1982, overhead will be assessed quarterly

and credits for interest earned from available cash balances will be calculated and added to their accounts. Following are the formulas used in these calculations:

Overhead Calculations:

$$\frac{\text{allocated overhead costs}}{\text{total direct expend. (all funds except capital)}} = \text{overhead rate} \times \text{fiscal unit earnings income budget} \div 4 = \text{quarterly overhead charges}$$

Investment Credit Calculation:

$$\frac{\text{beginning monthly cash balance} + \text{ending monthly cash balance}}{2} \times \text{OSU yield to maturity rate on short term invest.} = \text{monthly interest credit (debit)}$$

At the outset, the underlying philosophy supporting the project was that, to the extent possible, each income producing unit in the University should be totally self-supporting (i.e., each should bear the total cost associated with its activities, indirect as well as direct.). We believe the project has been successful in meeting this goal. The primary result, in addition to generating $8,000,000 additional revenue for the general fund, has been the refinement of a critical review process within each of the earnings operations as to what services can and should be provided. These reviews are consistent with the long standing philosophy of decentralization of management and administration at The Ohio State University.

THE FUTURE

Further development of the OSU Cost Allocation Model is proceeding along a number of paths, two of which seem particularly noteworthy. The University is presently engaged in a project designed to merge the OSU Cost Allocation Model with our Federal Indirect Cost Study under OMB Circular A-21 with the intent of eliminating the possibility of double charging between the two systems. This project could enhance recovery opportunities and markedly improve our Federal Indirect Cost Study methodology.

Although the model has been applied only to auxiliary enterprises and earnings operations, it provides a basis for the establishment of a responsibility center management approach, or other approaches vis-a-vis academic departments and programs. Given the difficult fiscal constraints facing the University, the use of cost analysis data in alternative management approaches may be worthy of serious consideration.

Having survived the bruising effects of months of negotiating these overhead rates, we are reminded of what, some time ago, was listed as the final stage of the project by Dr. William E. Vandament, OSU's Vice President for Finance and Planning, during conceptualization and development: "Reading the want ads in the CHRONICLE OF HIGHER EDUCATION until an appropriate job appears." One of the authors has already done so. The other is anxious to return to Columbus to determine whether greener pastures are advisable for him as well.

ABOUT THE CADMS SOFTWARE

While the NCHEMS Costing and Data Management System (CADMS) has been widely distributed, its use in institutional research and planning seems to be somewhat limited. This is unfortunate in view of the system's flexibility and utility.

In addition to the cost analysis application described in this paper CADMS has been used at The Ohio State University to develop a detailed and accurate Markov Student Flow Model, headcount enrollment forecasts, and departmental/college student credit hour workload projections. This application will be the subject of a later paper. Michael J. Haight, CADMS author, has used the software to conduct inter-institutional student flow analysis on a statewide basis in New Mexico. Finally, OSU is reviewing, with The Ohio Board of Regents, the possibility of using CADMS to project Ohio high school graduates by county as part of a strategic planning effort.

In summary, this public domain matrix manipulation software provides quick, easy, and cost-effective computational assistance in development of sophisticated university planning models.

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